- **<u>Response of 1st order circuits:-</u>**

The order is determined by the number of capacitors/inductors in the circuits. Hence, for 1st order we have to types: RL & RC circuits

General approach

RL	RC
1- Find the initial values $\boxed{i_L(t_o)}$ (if $t_o = 0 \rightarrow i(0)$) 2- Apply the change on the switch, redraw the circuit, and find the Norton equivalent circuit (calculate Isc & R_t) 3- Calculate $\boxed{\tau = L/ R_t}$ 4- Find the complete response using $i_L(t) = Isc + (i(t_o) – Isc)\, e^{-(t-to)/\tau}$	1- Find the initial values $\boxed{V_c(t_o)}$ (if $t_o = 0 \rightarrow v(0)$) 2- Apply the change on the switch, redraw the circuit, and find the Thevenin equivalent circuit (calculate Voc & R_t) 3- Calculate $\boxed{\tau = R_t C}$ 4- Find the complete response using $V_c(t) = Voc + (v(t_o) – Voc)\, e^{-(t-to)/\tau}$
<u>Note:-</u> For inductors; If DC → they act as a **short circuit** since $\boxed{v(t) = L\frac{di(t)}{dt}}$ You also could notice from the above that $\boxed{i_L(to^-) = i_L(to^+)}$ (No instant change allowed)	<u>Note:-</u> For Capacitors; If DC → they act as an open circuit since $\boxed{i(t) = C\frac{dv(t)}{dt}}$ You also could notice from the above that $\boxed{Vc(to^-) = Vc(to^+)}$ (No instant change allowed)

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How did we find the previous equations? See textbook pages 314-317